

CLAIMS:

1. An apparatus for securing an inner vessel having a bottom and a side wall and an outer vessel having a bottom wall and a side wall, within a cryogenic system, said inner vessel adapted to be enveloped by said outer vessel, wherein a vacuum may be maintained between the outer vessel and the inner vessel, said apparatus comprising:

at least one bottom-support component having at least one mating structure;

wherein said mating structure comprises at least one mating pair of one male-adapter and one female-receptor;

wherein one part of said mating pair is secured to the bottom of inner vessel while the other part of said mating pair is secured to the inner bottom of the outer vessel;

wherein said bottom-support component is adapted to hold the inner vessel at a position elevated from the inner bottom of the outer vessel;

wherein the inner vessel is prevented by said bottom-support component from horizontal and lateral movements.

2. The apparatus as recited in claim 1, further comprising at least one side-support component:

wherein said side-support component comprises at least one mating structure;

wherein said mating structure comprises at least one mating pair of one male-adapter and one female-receptor;

wherein one part of said mating pair is secured to the outer side wall of the inner vessel while the other part of said mating pair is secured to the inner side wall of the outer vessel;

wherein a fastening mechanism is employed to prevent relative rotational movements of the two parts of said mating pair, about a vertical axis near the geometric center of the outer vessel; and

wherein the inner vessel is prevented by said fastened side-support component from rotational movements about a vertical axis near the geometric center of the outer vessel.

3. The apparatus as recited in claim 1, further comprising at least one side-support component:

wherein said side-support component comprises at least one mating structure;

wherein said mating structure comprises two female receptor parts and one connecting pin-like element;

wherein one female receptor part of said mating structure is secured to the outer side wall of the inner vessel while the other female receptor part of said side-support mating structure is secured to the inner side wall of the outer vessel;

wherein a fastening mechanism is employed to secure at least one end of the connecting pin-like element of said side-support mating structure to prevent relative rotational movements of the two female receptor parts of said side-support mating structure, about a vertical axis near the geometric center of the outer vessel;

wherein the inner vessel is prevented by said fastened side-support mating structure from rotational movements about a vertical axis near the geometric center of the outer vessel.

4. The apparatus as recited in claim 1, wherein the cryogenic system is a high-temperature superconductor device system.

5. The apparatus as recited in claim 1, wherein the cryogenic system uses liquid nitrogen as the main cooling medium.

6. The apparatus as recited in claim 1, wherein said bottom-support mating structure has at least one part that is selected from a group consisting of a round peg, an arch peg, a ring peg, and a square peg.

7. The apparatus as recited in claim 1, wherein said bottom-support mating structure has at least one "L"-shaped leg for locking with the other part of the said bottom-support mating structure, to prevent vertical movement of the inner vessel along a vertical axis near the geometric center of the outer vessel after the inner vessel is secured by said "L"-shaped bottom-support mating structure.

8. An apparatus for securing an inner vessel and an outer vessel, within a cryogenic system, the inner vessel adapted to be enveloped by the outer vessel, wherein a vacuum may be maintained between the outer vessel and the inner vessel, said apparatus comprising:

mating structure means for preventing rotational movement of the inner vessel about a vertical axis with respect to the outer vessel; and

mating structure means for preventing axial movement of the inner vessel with respect to the outer vessel.

9. The apparatus as recited in claim 8, wherein said mating structure means is a round peg and corresponding round peg leg securing means.

10. The apparatus as recited in claim 8, wherein said mating structure means is a square peg and corresponding square peg leg securing means.

11. The apparatus as recited in claim 8, wherein said mating structure means is a "L"-shaped hook for locking with a respective leg mating structure to prevent planer movement along the vertical axis after the inner vessel is secured to said leg mating means.

12. The apparatus as recited in claim 8, wherein said mating structure means is a pin-like locking structure.

13. An apparatus for securing an inner vessel and an outer vessel, within a cryogenic system, the inner vessel adapted to be enveloped by the outer vessel, wherein a vacuum may be maintained between the outer vessel and the inner vessel, said apparatus comprising:

leg means for preventing rotational movement of said inner vessel about a vertical axis with respect to the outer vessel;

wherein said leg means is an "L"-shaped hook for locking with a respective female locking structure to prevent rotational movement in one direction about a vertical axis and to prevent planar movements perpendicular to the vertical axis after said inner vessel is secured to said leg mating means.

14. An apparatus for securing an inner vessel and an outer vessel, within a cryogenic system, the inner vessel adapted to be enveloped by the outer vessel, wherein a vacuum may be maintained between the outer vessel and the inner vessel, said apparatus comprising:

leg means for preventing rotational movement of said inner vessel about a vertical axis with respect to said outer vessel, wherein said leg means is a round peg and corresponding round peg leg securing means.

15. An apparatus for securing an inner vessel and an outer vessel, within a cryogenic system, the inner vessel adapted to be enveloped by the outer vessel, wherein a vacuum may be maintained between the outer vessel and the inner vessel, said apparatus comprising:

leg means for preventing rotational movement of said inner vessel about a vertical axis with respect to the outer vessel, wherein said leg means is a square peg and corresponding square peg leg securing means.